



Update: Science Plan for Near Shore Ecology and Fall Steady Flows

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Approach to Studying Steady Flow in September/October

1. Current Science Program
2. Near Shore Ecology/Steady Flow (NSE/SF) solicitation and project
3. 2008 NSE/SF Pilot project
4. 2009 Develop Steady Flows Science Plan

AMWG motion – May 2008

- Consistent with the requirements of the Final Environmental Assessment: Experimental Releases from Glen Canyon Dam, Arizona, 2008 through 2012 dated February 29, 2008, and the Final Biological Opinion for the Operation of Glen Canyon Dam dated February 27, 2008, the AMWG recommends to the Secretary of the Interior that the Department of the Interior **proceed with the scientific work identified to study the steady flows planned for September and October 2008** as outlined in the May 20, 2008 memorandum from the Chief of the Grand Canyon Monitoring and Research Center (GCMRC) to the Glen Canyon Dam Adaptive Management Program stakeholders. AMWG further recommends to the Secretary that he direct the GCMRC to, by **July 31, 2009**,
- Complete the design and development of a **September/October Steady Flow Science Plan for 2009-2012**, including a recommended range of flow parameters and resources,
- Work with the AMWG and TWG to establish measures of scientific success as part of the Science Plan, and
- Report to AMWG by June 1 of each year on the project included in the Science Plan, for review and possible revision

1. Current Science Program – FY08 approved work plan

- 2000 Low Summer Steady Flow (LSSF) Synthesis underway (synopsis, workshops)
- Current Studies
 - Physical
 - Mass Balance
 - Near Shore Temperatures
 - Biological
 - Aquatic Food Base
 - HFE Backwater Investigations
 - Lees Ferry Rainbow Trout
 - Fish Monitoring



Aquatic Food Base

- Collecting productivity and carbon transfer data over a range of flows, multiple years
- Monthly sampling of productivity and drift below Glen Canyon Dam ongoing – continues into 2009
- Collected near-shore productivity data on NSE pilot trip in August '08 (MLFF)
- Penultimate full river field trip in September '08 (Steady Flows)
- Final full river field trip January '09 (MLFF)
- Artificial stream experiments continuing (Loyola)
- Manuscript production underway

HFE Biological Investigations

- Riparian vegetation sampling Sep. '08
- Backwater seining Sep. – Oct. '08
 - GCMRC adding professional staff to review and interpret seining data 2001-2008



2. Near Shore Ecology/Steady Flows

- Solicitation reviewed by Science Advisors (May '08)
- Requested/received input from NPS, BOR, FWS
- Competitive solicitation (imminent)
- Solicitation open for 60 days
- Responses reviewed by independent panel (est. Nov. '08)



2. Near Shore Ecology Study – Background

- Biological Opinion Conservation Measure

“.... nearshore ecology study ... will relate river flow variables to ecological attributes of nearshore habitats (velocity, depth, temperature, productivity, etc.) and the **relative importance of such habitat conditions to important life stages of native and nonnative fishes**. This study will incorporate planned science activities for evaluating the high flow test on nearshore habitats as well as the 5-year period of steady flow releases in September and October.”

Near Shore Ecology/Steady Flows

- **Primary Science Questions**
 - What **sampling and analytical methods** are appropriate for determining **abundance**, density or occurrence of small native and nonnative fishes?
 - What are the **habitat** types that juvenile native and nonnative fish select?
 - How do **abiotic and biotic factors** influence individual **growth and survival** in these habitat types?
 - How available are these habitat types?



3. Pilot Study

- Study plan developed by GCMRC (May '08)
- Reviewed by Science Advisors (June '08)
- Conduct pilot study (Aug. – Sep. '08)



Pilot Study (Aug. & Sep. 2008)

■ Objectives

- Evaluate **methods** to obtain density, abundance, and occupancy of **near shore habitats** by small, juvenile fishes
- Estimate **relative piscivory risk** among different habitat types and flow patterns
- Estimate use and movement of fish in **backwater** habitats
- Evaluate methods to assess flow impacts on fish **growth** (otoliths, RNA/DNA ratios)

Pilot Study Aug. '08 (MLFF)

- Investigating
 - Humpback chub habitat use
 - Humpback chub population in LCR reach
 - Capture and tagging methods
 - Collecting flannelmouth sucker samples for growth study



Pilot Study Aug. '08 (MLFF)

- Preliminary observations
 - Humpback chub numbers relatively high
 - Nonnative fishes number relatively low
 - Trout species generally absent in sampling 2005-07, now being observed in small numbers
 - Preliminary data presented to TWG: Oct. '08



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Pilot Study Sep. '08 (Steady Flows)

- Investigating
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 - Humpback chub population in LCR reach
 - Capture and tagging methods



NSE/SF Studies

1. Continue with the current science program

- Existing projects help inform future projects
- 2000 LSSF synthesis underway
- Existing projects contribute to understanding 2008 Steady Flows
 - Aquatic food base
 - Riparian vegetation monitoring
 - Rainbow trout monitoring
 - Near shore temperature modeling

2. NSE/SF Solicitation

3. NSE Pilot Study

NSE/SF Studies

4. Develop Fall Steady Flows Science Plan FY 2009

- Cooperator (Jan. '09)
- LSSF synthesis draft plans (Feb. '09)
- GCMRC draft fall steady flows science plan (1 Apr '09)
- SA and TWG review of plan (Apr. – June '09)
- Finalize plan (July '09)